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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/625,018

07/23/2003

Eugene A. Fitzgerald

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7590

06/25/2004

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EXAMINER

DUONG, KHANH B

ART UNIT

PAPER NUMBER

2822

DATE MAILED: 06/25/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/625,018

Applicant(s)

FITZGERALD ET AL.

Examiner

Khanh Duong

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 July 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 28-48 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 28-48 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

This Office Action is in response to the Preliminary Amendment filed July 23, 2003.

Accordingly, claims 1-27 were cancelled and new claims 28-48 were added.

Currently, claims 28-48 are pending in the application.

Information Disclosure Statement

The information disclosure statements submitted on July 23 and December 31, 2003 and January 26 and March 8, 2004 have been considered by the examiner.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 28-30, 33, 37-39 and 42 are rejected under 35 U.S.C. 102(b) as being anticipated by Rim et al. (“Enhanced Hole Mobilities in Surface-channel Strained-Si p-MOSFETs”, IEDM, 1995, pp. 517-520).

Re claims 28, 29, 33, 37, 38 and 42, Rim et al. (“Rim”), cited by applicant, discloses in Fig. 1 an integrated circuit [see pages 20.3.1 to 20.3.3] comprising: a heterostructure including a substrate; a graded buffer layer thereover; a strained layer (n-Strained Si); a relaxed layer ($\text{Si}_{1-x}\text{Ge}_x$) between the strained layer and the graded buffer layer, the relaxed layer inducing strain within the strained layer; and a pMOSFET (p-channel transistor) and an nMOSFET (n-channel transistor) each having a channel through the strained layer and being interconnected in a CMOS

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circuit [see "Summary", page 20.3.2]. Furthermore, the recitation "[a] CMOS inverter" has not been given patentable weight because it has been held that a preamble is denied the effect of a limitation where the claim following the preamble is a self-contained description of the structure not depending for completeness upon the introductory clause. *Kropa v. Robie*, 88 USPQ 478 (CCPA 1951).

Re claim 30 and 39, Rim expressly discloses in Fig. 1 the heterostructure further comprises a planarized surface (graded buffer layer) between the strained layer and the substrate.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

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Claims 31, 34, 35 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rim.

Re further claims 31, 34, 35 and 40, Rim fails to show the specific parameters regarding the surface roughness of the strained layer, the Ge content “x” in the SiGe layer, or the ratio of gate width of the pMOSFET to the gate width of the nMOSFET.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device of Rim by selecting the specific parameters as required by the claims, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

Claims 32 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rim in view of Lustig et al. (US 5,998,807).

Re claims 32 and 41, Rim fails to disclose an oxide layer disposed beneath the strained layer.

Lustig et al. (“Lustig”), cited by applicant, expressly teaches in FIGs. 1-9 an insulating oxide layer 2 disposed beneath the strained layer 5 for the purpose of manipulating the capacitance of the sub-regions 16, 18, 20 and 23 of the source and drain regions [see col. 7, ln. 11-28].

Since Rim and Lustig are both from the same field of endeavor, the purpose disclosed by Lustig would have been recognized in the pertinent prior art of Rim.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device of Rim with the teaching of Lustig, since Lustig states at column

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7, lines 18-20 that such modification would provide a CMOS circuit arrangement having capacitances comparable to those in a MOS transistor in semi-insulating GaAs, but with better saturation drift speeds.

Claims 36 and 43-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rim in view of Kant (U.S. 6,316,301).

Re claims 36 and 43-48, Rim fails to disclose using the CMOS circuit to form a logic gate, a NOR gate, an XOR gate, a NAND gate, pull-up and pull-down transistors, and an inverter.

Kant, cited by applicant, teaches that CMOS circuits are used to form an inverter [see Fig. 1; col. 1, ln. 37-40] and a number of suitable logic gates such as NOR gates, XOR gates and NAND gates [see Fig. 4; col. 4, ln 20-22].

Since Rim and Kant are both from the same field of endeavor, the purpose disclosed by Kant would have been recognized in the pertinent prior art of Rim.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the CMOS circuit of Rim to form the devices as suggested by Kant. Furthermore, it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. *Ex Parte Masham*, 2 USPQ, F.2d 1647 (1987).

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Conclusion


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khanh Duong whose telephone number is (571) 272-1836. The examiner can normally be reached on Monday - Thursday (9:00 AM - 6:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on (571) 272-1852. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



KBD



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